QPL 1 TRAFFIC CONTROL MATERIALS

SECTION: A. RAISED, SNOWPLOWABLE REFLECTIVE PAVEMENT MARKERS AND REPLACEMENT LENS

PROCEDURES

GENERAL

This evaluation procedure outlines the Department's approval process for **Snowplowable, Permanent and Temporary Raised Pavement Markers** used for marking pavement lines for project and in work zones.

SPECIFICATIONS

716.01 Pavement Markings
919.05 Snowplowable Pavement Markers
919.04 Raised Pavement Markers

PROCEDURES

A completed Product Evaluation Form, MSDS sheets, if applicable, product data information and a sample of the product being tested must be submitted to the Division of Materials and Test. The Department bases product approval on a review of NTPEP data and a **1**-year field evaluation **if deemed necessary.**

Review of NTPEP Evaluation Data

Permanent and Temporary Raised Pavement Markers

Laboratory Evaluation will follow ASTM D4280, Compressive Strength, Lens Impact Strength, Resistance to Temperature Cycling, Coefficient of Luminous Intensity, Flexural Strength, and Abrasion Resistance.
Field Observation consists of visual observation of the markers for Marker case condition, Lens surface conditions, and Night Visibility.

Snowplowable Pavement Markers

Laboratory Evaluation will follow ASTM D4383, Coefficient of Luminous Intensity section 10.1, Abrasion resistance section 1.2.
Field Observation will follow the NTPEP rating of field observations for Housing, Lens, and Night Visibility. Retroreflectivity will follow ASTM E1696

Lens Replacement will follow the procedures for the snowplowable markers, **Hence** a lens used in an approved snowplowble marker will be placed on the lens replacement list.

Raised and Temporary Pavement Markers

Laboratory Evaluation:

ASPHALT / CONCRETE

Testing of markers shall be in accordance with ASTM D4280

No minimums set forth, However the Departments' Traffic Control Products Materials Committee shall review the laboratory data if deemed necessary.

Field Observations:

The Field Observation will be based on a rating scale from NTPEP for Marker Case Condition, Lens Surface Condition and Lens Internal conditions as follows.

Marker Case Condition:

5= Excellent, Completely intact, "Like New" condition
4= Good, Minor scrapes and scratches
3= Fair, Obvious damage but still functional
2= Poor, Major damage, marginally functional
1= Very Poor, Non-functional
0= Missing

Lens Surface Condition:

5= Excellent, Completely intact, "Like New" condition
4= Good, Minor scrapes and scratches
3= Fair, Some abrasions and scares
2= Poor, Scarring over large areas
1= Very Poor, Non-functional
0= Missing

The following minimums shall be met after six and twelve month evaluation is completed from a NTPEP test deck

Average of the 100 markers tested on Asphalt (50) and Concrete (50) for each category listed below

	6 Month Criteria	12 Month Criteria
Marker Case Condition:	Minimum rating of **3.5**	Minimum rating of **2.5**
Lens Surface Condition:	Minimum rating of **3.5**	Minimum rating of **2.5**

Snowplowable Pavement Markers

ASPHALT / CONCRETE

Laboratory Evaluation:

Testing of markers shall be in accordance with ASTM D4383

No minimums set forth, However the Departments' Traffic Control Products Materials Committee shall review the laboratory data if deemed necessary.

Field Observations:

The Field Observation will be base on a rating scale from NTPEP for **Housing (or Holder) Condition, Lens Face Condition and Night Visibility** as follows.

Housing:
5= Excellent, Completely intact, In "Like New" condition, good adhesion
4= Good, Minor Scrapes/Scratches visible on close examination of surfaces
3= Fair, Some cuts but none larger than 10 mm
2= Poor, Some cuts larger than 10mm
1= Very Poor, Showing significant wear, no longer protecting reflector
0= Missing, or damaged beyond use

Lens Face Condition:
5= Excellent, Completely intact, In "Like New" condition
4= Good, Minor scrapes/scratches visible on close examination of surfaces
3= Fair, Some abrasions, none greater than 5 mm
2= Poor, Some large cuts/cracks/chips greater than 5 mm
1= Very Poor, Showing significant wear, significant discoloration
0= Missing, or damaged beyond use

Night Visibility:
5= Excellent, Completely intact, Bright, in "Like New" condition
4= Good, Clearly visible from greater than 100 m
3= Fair, Some loss in reflectivity, barely visible from 100 mm
2= Poor, Significant loss of reflectivity, visible from 50 mm
1= Very Poor, Significant loss of reflectivity, barely visible, discoloration
0= Missing, or totally non-reflective

The following minimums shall be met after the two-year evaluation is completed from a NTPEP test deck

Average of the 100 markers tested on Asphalt (50) and Concrete (50) for each category listed below

Housing: Minimum rating of **2.5**

Lens Face Condition: Minimum rating of **2.5**

Night Visibility: Minimum rating of **2.5**

Lens Replacement will follow the procedures for the snowplowable markers, **Hence** a lens used in an approved snowplowble marker will be placed on the lens replacement list.

SECTION B. PREFORMED PLASTIC PAVEMENT MARKINGS

PROCEDURES

GENERAL:

This evaluation procedure outlines the Department's approval process for preformed plastic pavement markings used for marking pavement lines, dimensions, patterns, locations and other details shown on the plans.

SPECIFICATIONS

TDOT 716.06 and 919.03
MUTCD

PROCEDURES

A completed Product Evaluation Form, MSDS sheets, if applicable, product data information and sample of the product being tested must be submitted to the Division of Materials and Tests.

Product approval is based on certification that the material meets applicable TDOT specifications. In addition, a 6 month to 1 year field evaluation may be required at the Department's discretion.

Products meeting the above requirements will be presented to the Department's Traffic Control Products Materials Committee (TCPMC) which will make a recommendation as to whether the product will be added to the Qualified Products List.

NOTE: This procedure is currently under review by the Department. TDOT's intent is to utilize National Transportation Product Evaluation Program (NTPEP) data for approval of these products

SECTION C. TEMPORAY TAPE (REMOVABLE AND NON REMOVABLE)

PROCEDURES

GENERAL

This evaluation procedure outlines the Department's approval process for temporary tapes used for marking pavement lines of a temporary nature in work zones.

SPECIFICATIONS

NONE

PROCEDURES

A completed Product Evaluation Form, MSDS sheets, if applicable, product data information and sample of the product being tested must be submitted to the Division of Materials and Tests.

Product approval is based on a review of NTPEP data and a 4 to 6 month field evaluation by the Department if deemed necessary.

REVIEW of NTPEP EVALUATION DATA

Submittal of product to one or more NTPEP evaluation decks, in the past 5 years (latest is a 1997 test deck).
All products must be reevaluated at a minimum of 5 years, with a 1 year grace period after the fifth year. Hence a product from a 1997 test deck will be up for retest in 2002, the product will be given a grace period of one year from the end of that fifth year to retest on one or more NTPEP evaluation decks.
Evaluation period 4 months (120 days).

Retroreflectivity to be measured with an instrument (i.e. LTL 2000) designed to measure data at a simulated distance of 30 meters, with an illumination angle of 1.24 degrees and an observation angle of 2.29 degrees.
The following minimum values shall be achieved for inclusion on the Departments' Qualified Products List.

ASPHALT/CONCRETE

RETROREFLECTIVITY
(Minimum)

Skip Line
Longitudinal or Transverse

Initial		Final (120 Days)	
White	500		250
Yellow	350		175

Wheel Path
Longitudinal or Transverse

Initial		Final (120 Days)	
White	500		100
Yellow	350		50

SECTION D. ALTERNATIVE PAVEMENT MARKING MATERIALS

PROCEDURES

GENERAL

This evaluation procedure outlines the Department's approval process for thermoplastic pavement markings used for marking pavement lines, dimensions, patterns, locations and other details shown on the plans.

SPECIFICATIONS

TDOT 716.03 and 919.01

MUTCD

Component QPL

A component replacement for thermoplastic systems shall be evaluated by the Division of Materials and Test and submitted to the Pavement Marking Committee for consideration as a component replacement.

PROCEDURES

A completed Product Evaluation Form, MSDS sheets, if applicable, product data information and sample of the product being tested must be submitted to the Division of Materials and Tests.

Product approval is based on certifications that the material meets applicable TDOT specifications. In addition, a 6 month to 1 year field evaluation may be required at the Department's discretion.

Products meeting the above requirements will be presented to the Department's Traffic Control Products Materials Committee (TCPMC) which will make a recommendation as to whether the product will be added to the Qualified Products List.

NOTE: This procedure is currently under review by the Department. TDOT's intent is to utilize National Transportation Product Evaluation Program (NTPEP) data for approval of these products.

SECTION E. BITUMINOUS PAVEMENT MARKER ADHESIVE

PROCEDURES

GENERAL

This evaluation procedure outlines the Department's approval process for adhesives used to bond pavement markers to portland cement concrete pavement, hot bituminous pavement and chip-sealed surfaces.

SPECIFICATIONS

TDOT 919.02

PROCEDURES

A completed Product Evaluation Form, MSDS sheets, if applicable, product data information and sample of the product being tested must be submitted to the Division of Materials and Tests.

Product approval is based on certifications that the material meets the applicable TDOT specifications.
In addition, the Department will verify the flash point(ASTM D 92), penetration(ASTM D 5), viscosity(ASTM D 2669) and softening point(ASTM D 36).

SECTION F. FLEXIBLE SURFACE AND GROUND MOUNTED DELINEATOR POSTS

PROCEDURES

GENERAL

This specification covers the use of flexible delineator post, both surface and ground mounted, for use on Tennessee highway projects.

SPECIFICATIONS

TDOT 916.08

PROCEDURES

A completed Product Evaluation Form, MSDS sheets, if applicable, product data information,and NTPEP test data, must be submitted to the Division of Materials and Tests. The Department bases product approval on a review of NTPEP data and additional weathering criteria.

Review of NTPEP Evaluation Data

Field Evaluation

Based on both Winter and Summer Impact Data at least 5 of the 8 post shall:

- **Final Degree List:** Remain intact and securely anchored and return to their original vertical orientation within an Angle of ± 10º

- **Sheeting Loss %:** In addition, each post meeting the **Final Degree List** requirement above shall have no more than 50% sheeting loss and show minimal signs of distress (cracking, loss of rigidity).

- The manufacturer shall certify that the materials to be supplied are formulated the same as when tested by NTPEP and will conform to the requirements of this specification.

Additional Criteria

Weathering: The delineator post shall be capable of withstanding 1,000 hours of UV exposure without significant color change or physical deterioration as might be exhibited by splitting, cracking, delaminating, etc.

SECTION G. GUARDRAIL AND BARRIER/PARAPET DELINEATION

PROCEDURES

GENERAL

This evaluation procedure outlines the Department's approval process for Guardrail and Barrier wall delineation.

SPECIFICATIONS

TDOT Standard Drawing S-SSMB-1
TDOT Standard Drawing S-SSMB-2
TDOT Standard Drawing STD-1-1
TDOT Standard Drawing T-WZ-11,12,14,16,18,19,32

PROCEDURES

A completed Product Evaluation Form, MSDS sheets (if applicable), product data information, and a sample of the product being tested must be submitted to the Division of Materials and Tests.

Product approval is based on delineators meeting requirements of Standard Drawing and a 6 month field evaluation. At the end of the 6-month field evaluation, a minimum of 95% of the delineators must be functional.

Item Numbers

CONCRETE BARRIER/PARAPET/PORTABLE BARRIER RAIL DELINEATION		
713-02.25	**MEDIAN BARRIER DELINEATOR (DOUBLE)**	**EACH**
713-02.26	**CONCRETE BARRIER/PARAPET DELINEATOR**	**EACH**
713-02.27	**CONCRETE BARRIER/PARAPET DELINEATOR (BI-DIRECTIONAL)**	**EACH**
705-04.50	**PORTABLE BARRIER RAIL DELINEATOR**	**EACH**
712-04.50	**PORTABLE BARRIER RAIL DELINEATOR**	**EACH**
GUARDRAIL POST DELINEATION		
705-04.25	**GUARDRAIL & BARRIER DELINEATOR**	**EACH**
GUARDRAIL BEAM DELINEATION		
705-04.25	**GUARDRAIL & BARRIER DELINEATOR**	**EACH**
CONCRETE BARRIER/PARAPET DELINEATION ENHANCEMENT		
713-02.22	**BARRIER WALL DELINEATION ENHANCEMENT**	**L.F**
713-02.23	**BARRIER WALL DELINEATION ENHANCEMENT (BI-DIRECTIONAL)**	**L.F**

GUARDRAIL BEAM DELINEATION ENHANCEMENT

705-04.21 GUARDRAIL DELINEATION ENHANCEMENT L.F

705-04.23 GUARDRAIL DELINEATION ENHANCEMENT (BI-DIRECTIONAL) L.F

SECTION H. WORKZONE TRAFFIC DRUMS

PROCEDURES

GENERAL

This evaluation procedure outlines the Department's approval process for flexible traffic drums.

SPECIFICATIONS

TDOT 712.02 and 916.06

PROCEDURES

A completed Product Evaluation Form, MSDS sheets, if applicable, product data information, and NTPEP test data, must be submitted to the Division of Materials and Test. The Department bases product approval on a review of NTPEP data and additional weathering criteria.

Review of NTPEP Evaluation Data

Based on both Winter and Summer Impact Data

- No permanent deformation or damage to the drum, i.e., splits, breaks or cracks that impairs its function or mars its physical appearance, thereby rendering the drum unusable:
- No significant loss of effectiveness of the reflective sheeting;
- A non-hazardous separation of the drum from its removable base/ballast;
- Drums shall be re-stackable

The manufacturer shall certify that the material to be supplied, to include the design of the drum and formulation of plastics used in the manufacture are the same as when tested by the NTPEP and will conform to the requirements of this specification.

The Department reserves the right to periodically sample and test flexible drums.